

What is claimed is:

1. A transflective liquid crystal display device comprising:
 - a pair of substrates;
 - a liquid crystal layer sandwiched between the substrates;
 - 5 pixel electrodes disposed on a surface of one of the substrates facing the liquid crystal layer, each of the pixel electrodes including an electrode for reflective display and an electrode for transmissive display;
 - a counter electrode disposed on a surface of the other substrate facing the liquid crystal layer; and
 - 10 an alignment film covering the surface of each of the substrates facing the liquid crystal layer,
 - wherein a distance from the electrode for transmissive display to the other substrate is different from a distance from the electrode for reflective display to the other substrate; and
 - 15 wherein liquid crystal molecules at a surface facing the electrode for reflective display above the electrode for reflective display are aligned in a same direction as liquid crystal molecules above the electrode for transmissive display that are in a same plane as the liquid crystal molecules above the electrode for reflective display,
 - 20 the plane being parallel to principal surfaces of the substrates.
2. The transflective liquid crystal display device according to claim 1, wherein the alignment films are treated so that principal axes of liquid

crystal molecules in contact with the alignment films are parallel to surfaces of the alignment films, the liquid crystal molecules being of the liquid crystal layer.

3. The transflective liquid crystal display device according to claim 2,
5 wherein liquid crystal molecules in a region corresponding to the portion of the pixel electrode at a longer distance from the other substrate are driven in an OCB mode such that alignment changes between a splay alignment and a bend alignment, and wherein liquid crystal molecules in a region corresponding to the other portion of the pixel electrode are driven in an
10 R-OCB mode exhibiting a hybrid alignment.

4. The transflective liquid crystal display device according to claim 3, wherein the alignment film in a region above the electrode for transmissive display and the alignment film in a region above the electrode for reflective display align liquid crystal molecules in contact with the alignment films to
15 different pretilt angles.

5. The transflective liquid crystal display device according to claim 3, further comprising means for promoting transition of alignment of the liquid crystal molecules, the means being provided in the region corresponding to the electrode for transmissive display.

20 6. The transflective liquid crystal display device according to claim 1, wherein the alignment film on the substrate on which the pixel electrodes are not disposed is treated so that alignment of a liquid crystal material in

contact therewith is the same in a region corresponding to the electrode for transmissive display and a region corresponding to the electrode for reflective display, the liquid crystal material being of the liquid crystal layer.

7. The transflective liquid crystal display device according to claim 6,
5 wherein the liquid crystal layer contains a chiral material.

8. The transflective liquid crystal display device according to claim 6,
wherein the alignment film on the substrate having the pixel electrodes
disposed thereon is treated so that alignment of the liquid crystal material
in contact therewith is different in the region corresponding to the electrode
10 for transmissive display and the region corresponding to the electrode for
reflective display, the liquid crystal material being of the liquid crystal layer.

9. The transflective liquid crystal display device according to claim 1,
wherein the thickness of the liquid crystal layer above the electrode for
transmissive display is larger than that of the liquid crystal layer above the
15 electrode for reflective display.

10. The transflective liquid crystal display device according to claim 1,
further comprising a retardation film provided on each of a pair of the
principal surfaces, the retardation films being for compensating residual
retardation of liquid crystals at boundaries with the substrates upon
20 application of voltage, according to viewing angle directions.

11. The transflective liquid crystal display device according to claim 10,

wherein the retardation films are each composed of a discotic liquid crystal having a disc-like shape and a hybrid alignment.

12. The transflective liquid crystal display device according to claim 10, wherein the retardation film satisfies a relationship $n_x > n_y > n_z$, where n_x is a maximum refractive index in a plane of the film, n_y is a refractive index in a direction perpendicular to the plane of the n_x , and n_z is a refractive index in a direction perpendicular to a surface of the film.

13. A transflective liquid crystal display device comprising:

- a pair of substrates;
- 10 a liquid crystal layer sandwiched between the substrates;
- pixel electrodes disposed on a surface of one of the substrates facing the liquid crystal layer, each of the pixel electrodes including an electrode for reflective display and an electrode for transmissive display;
- 15 a counter electrode disposed on a surface of the other substrate facing the liquid crystal layer;
- an alignment film covering the surface of each of the substrates facing the liquid crystal layer; and
- a color filter layer disposed so as to oppose to the electrode for reflective display; and
- 20 a light source for irradiating the liquid crystal layer with colored light on a time division basis through the electrode for transmissive display.

14. The transflective liquid crystal display device according to claim 13, wherein the color filter layer is disposed in a region including a path of the colored light.

15. The transflective liquid crystal display device according to claim 13, wherein a wavelength of the colored light substantially corresponds to a wavelength at which transmittance of the color filter layer exhibits a peak.

16. The transflective liquid crystal display device according to claim 13, wherein the color filter layer is such that a wavelength of light to be transmitted through the color filter layer is changed by means of an external input.

17. The transflective liquid crystal display device according to claim 13, wherein the color filter layer includes a cholesteric liquid crystal and a pair of electrodes for applying a voltage to the cholesteric liquid crystal.

18. The transflective liquid crystal display device according to claim 17, wherein one of the pair of electrodes also serves as the electrode for reflective display.

19. The transflective liquid crystal display device according to claim 17, wherein the color filter layer is disposed on the substrate having disposed thereon the electrode for reflective display such that the color filter layer and the electrode for reflective display are stacked on top of each other.

20. The transflective liquid crystal display device according to claim 17,

wherein the substrates are each made of a synthetic resin and the color filter layer is disposed on an outer surface of one of the substrates.

21. The transflective liquid crystal display device according to claim 17,
wherein a ratio of the area of the electrode for transmissive display to the
5 area of the electrode for reflective display is 0.1–0.6.

22. A transflective liquid crystal display device comprising:
a pair of substrates;
a liquid crystal layer sandwiched between the substrates;
pixel electrodes disposed on a surface of one of the substrates facing
10 the liquid crystal layer, each of the pixel electrodes including an
electrode for reflective display and an electrode for transmissive
display;
a counter electrode disposed on a surface of the other substrate facing
the liquid crystal layer;
15 an alignment film covering the surface of each of the substrates facing
the liquid crystal layer; and
a reflective layer for selectively reflecting light of a specified
wavelength, the reflective layer being stacked on the electrode for
reflective display.

20 23. The transflective liquid crystal display device according to claim 22,
further comprising a light source for irradiating the liquid crystal layer with
colored light on a time division basis through the electrode for transmissive
display.

24. A transflective liquid crystal display device comprising:
- a pair of substrates;
 - a liquid crystal layer sandwiched between the substrates;
 - pixel electrodes disposed on a surface of one of the substrates facing
 - 5 the liquid crystal layer, each of the pixel electrodes including an electrode for reflective display and an electrode for transmissive display;
 - a counter electrode disposed on a surface of the other substrate facing the liquid crystal layer;
 - 10 an alignment film covering the surface of each of the substrates facing the liquid crystal layer;
 - a color filter layer disposed so as to oppose to the pixel electrodes; and
 - a light source for irradiating the liquid crystal layer with white light through the electrode for transmissive display, the white light
 - 15 having a spectrum of a specified peak wavelength.

25. The transflective liquid crystal display device according to claim 24, wherein the peak wavelength of the bright-line spectrum substantially corresponds to a wavelength at which transmittance of the color filter layer exhibits a peak.

- 20 26. The transflective liquid crystal display device according to claim 24, wherein the color filter layer is disposed in a region including a path of the white light.

27. A transflective liquid crystal display device comprising:

a pair of substrates;
a liquid crystal layer sandwiched between the substrates;
pixel electrodes disposed on a surface of one of the substrates facing
the liquid crystal layer, each of the pixel electrodes including an
5 electrode for reflective display and an electrode for transmissive
display;
a counter electrode disposed on a surface of the other substrate facing
the liquid crystal layer;
an alignment film covering the surface of each of the substrates facing
10 the liquid crystal layer;
~~a color filter layer disposed so as to oppose to the electrode for~~
~~reflective display;~~
a light source for irradiating the liquid crystal layer with light through
the electrode for transmissive display; and
15 a light guiding plate for propagating light to the liquid crystal layer
through the substrate having formed thereon the electrode for
transmissive display, the light being irradiated from the light
source;
wherein the light guiding plate selectively emits the light to a region
20 including the electrode for transmissive display.

28. The transreflective liquid crystal display device according to claim 27,
the light guiding plate has a depression or a protrusion in a region
corresponding to the electrode for transmissive display.

29. A transflective liquid crystal display device comprising:

a pair of substrates;

a liquid crystal layer sandwiched between the substrates;

pixel electrodes disposed on a surface of one of the substrates facing

5 the liquid crystal layer, each of the pixel electrodes including an
 electrode for reflective display and an electrode for transmissive
 display;

a counter electrode disposed on a surface of the other substrate facing
 the liquid crystal layer;

10 an alignment film covering the surface of each of the substrates facing
 the liquid crystal layer;

a color filter layer disposed so as to oppose to the electrode for
 reflective display;

15 a light source for irradiating the liquid crystal layer with light through
 the electrode for transmissive display; and

a light guiding plate for propagating light to the liquid crystal layer
 through the substrate having formed thereon the electrode for
 transmissive display, the light being irradiated from the light
 source;

20 wherein the substrates are each made of a synthetic resin and the color
 filter layer is formed on a surface of one of the substrates on a
 side not facing the liquid crystal layer.